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A Validity Study of the Construct "Most Highly Valued Representational System" in Human Auditory and Visual Perceptions.

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A VALIDITY STUDY OF THE CONSTRUCT "MOST HIGHLY VALUED REPRESENTATIONAL SYSTEM" IN HUMAN AUDITORY AND VISUAL PERCEPTIONS

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ABSTRACT

Bandler and Grinder (1975) proposed the construct "most highly valued representational systems" to describe auditory, visual, and kinesthetic perceptual orientations among individuals. They set forth a predicate method for determining an individual's primary representational system. Contrary to Bandler and Grinder's construct, experimental evidence consistently supports the principle of visual dominance among humans.

In order to test the effectiveness of Bandler and Grinder's constructs, 221 volunteers were screened by an alternate predicate method. 22 subjects were selected as "highly auditory" and 19 subjects were selected as "highly visual." These 41 subjects were asked to give their first impressions to 75 simultaneous, audio-visual presentations of letters, numbers, and words. Twenty-five of the simultaneous presentations were discrepant. Subjects were then individually interviewed. Their verbal responses to standardized questions were tape recorded.

Four questions were examined.

1) Do the verbs, adverbs, and adjectives expressed by subjects in their taped interviews yield discrete classifications of primary representational systems by Bandler and Grinder's predicate method?

2) Do the predicate-method classifications correlate with the screening classifications derived by the alternate predicate method?

3) Do predicate-method classifications indicate whether individuals will make auditory or visual responses to the twenty-five discrepant presentations of auditory and visual stimuli?

4) Will subjects classified as auditory or visual respectively resort to auditory or visual responses with greater frequency as task and stimulus difficulty are increased over the five series of discrepant stimulus presentations?

Predicate tabulations indicated that the majority of individuals could not be effectively classified by Bandler and Grinder's predicate method.

A point biserial correlation was performed using the auditory and visual screening classifications and the proportion of auditory predicates expressed during the experimental interviews. No relationship was found between the two methods of classification.

Attentional responses were analyzed by a 2 x 5 repeated measures ANOVA. No significant relationships were found between predicate-method classifications and responses to the discrepant stimulus presentations. Though a significant interaction resulted, the pattern of the means across the five tasks was not the pattern predicted. There was no significant relationship between predicate-method classifications and attentional responses across increasingly difficult tasks.

The major finding of the study was a visual dominance effect. Thirty-six of the thirty-seven subjects responded more frequently to the visual stimuli than to the auditory stimuli on discrepant presentations. 92% of the possible 925 responses were visual, supporting the generalizability of the visual dominance principle to an experimental paradigm in which televised linguistic symbols are presented without measuring the reaction times of subjects' responses as in previous studies.

This further evidence for visual dominance in human perceptions casts doubt on the constructs of Bandler and Grinder, but reasserts the importance of future research relating conscious attentional mechanisms to the ways visual perceptions gain control of these mechanisms.

INTRODUCTION

There is nothing new about the notion that humans perceive stimuli by means of sensory systems and thereby organize their thoughts, feelings, and behaviors. What is novel is the assertion of Bandler and Grinder (1975) that individuals differ significantly in valuing one of three major "representational systems," either their visual or auditory or kinesthetic systems.

Do we see, hear, and feel equally. . .at the same time? Do we see more than we hear? Do some of us hear more than we feel? Do most of us tend to emphasize our visual perceptions rather than our auditory perceptions or kinesthetic perceptions as we organize our sensory experiences? Casual reflections and observations may lend support for a variety of answers to the above questions. The question for the present study, however is: "To what extent does the construct 'most highly valued representational system' validly discriminate perceptual differences between individuals?"

The Construct

The construct "most highly valued representational system" was originated by Bandler and Grinder (1975) from a fertile variety of sources. Basically, Bandler and Grinder may be described as clinical theorists. Their orientation is clinical in that they are primarily concerned with effecting change in the thoughts, feelings, and behaviors of those who seek their services - clinical students, practitioners, and clients. They are theorists in that they have developed concepts and structures which attempt to relate and explain human choice, language, and behavior. At times they appeal as scientists to the empirical efforts of researchers such as Bach-y-Rita (1972), Boring (1957), Dimond and Beaumont (1974), and Gazzaniga (1974). The scientific method, however, is not their discipline. They select empirical evidence which fits their theoretical predilections and use it to extrapolate their comprehensive and persuasive rationale for a structure of therapeutic principles and techniques.

The linguistic theory of Noam Chomsky (1967) is clearly Bandler and Grinder's most valued source in developing their own novel theory of perception and communication. Chomsky's influence may be noted in the following, abbreviated rationale for Bandler and Grinder's concept of "most highly valued representational systems."

Bandler and Grinder begin by acknowledging that human perception is an active process mediated through sensory receptor systems. Human beings cognitively frame and organize their sensations according to learned social conventions, especially language. While human beings sense the world by similar means and perceive that world by similar processes, there are significant differences between individuals and their perceptions by virtue of their unique personal histories. An individual's perceptual model of the phenomenal world may be likened to a personally drawn map of a particular territory. The map is not the territory, but a representation of the individual's perceptions of the territory. And different individuals will construct different maps of what is assumed to be the same territory.

Bandler and Grinder are interested in how individuals map or model or represent their experiences of the world. They conclude that language is the best understood system by which humans model their sensations and perceptions of events and that Chomsky's transformational grammar theory is the best representation of the structure of human language. To put it another way, transformational grammar is the best model of human language, and language is the means by which humans model their experiences of the world.

According to Bandler and Grinder's presentation of the transformational grammar model, humans use language in two ways. First, language is used to represent or create models of our perceptions of the world. This unarticulated linguistic representation, rich and complex, but patterned or organized, is called a Deep Structure. Secondly, language is used to communicate Deep Structure representations of the world to other people. Unable to verbalize the complete, basic representation, we invariably transform our Deep Structures into Surface Structures. We select certain words and delete others. We make syntactic choices in ordering our words. We generalize, nominalize or otherwise distort the Deep Structure as we transform it into a Surface Structure. Both modeling our perceptions (Deep Structures) and communicating those models (Surface Structures), according to transformational grammarians, are rule-governed processes. Transformational grammar, then, is the development and explication of the rules which reflect our consistent intuitions about what constitutes a sentence, whether that sentence is semantically and syntactically well-formed, and whether logical relations are adequately expressed.

It would follow from the foregoing summary that language is the "most highly valued representational system" for humans. Bandler and Grinder, however, reserve that construct for another phenomenon which they propose in relation to sensory "input channels." They write:

> The nervous system which is responsible for producing the representational system of language is the same nervous system by which humans produce every other model of the world - thinking, visual, kinistic (sic), etc. . . The same principles of structure are operating in each of these systems. Thus, the formal principles which linguists have identified as part of the representational system called language provide an explicit approach to understanding any system of any human modeling. (Bandler and Grinder, 1975, 37-38)

Language is the major representational system by which we map our experiences and communicate them. There are, however, at least five subset sensory systems which are constantly receiving information. According to Bandler and Grinder, we rely primarily on three of these "input channels" to access information about the world. Vision, audition, and kinesthesis provide most of the information which typically gains our conscious attention.

Individuals tend to rely most heavily on one of the three major sensory systems for modeling or representing information about the world. A person who favors the visual input channel for representing incoming stimuli will probably also attend to visual stimuli more than to auditory or kinesthetic stimuli. Information received through a non-visual sensory "input channel," according to Bandler and Grinder, will likely be switched to a visual map for storage. For example, the visually-inclined individual may hear the word "elephant" and create a visual image of an elephant rather than registering it in an auditory model according to the auditory channel by which it was received.

> The representational systems that are highly valued and highly developed in each of us will differ, either slightly or dramatically. . . Furthermore, each person will have a most highly valued representational system which will differ from the most highly valued representational system of some other person. From this fact - namely, that person X has a most highly valued representational system that differs from that of person Y - we can predict that each will have a dramatically different experience when faced with the "same real world experience. (Grinder and Bandler, 1975, 9)

Bandler and Grinder define an individual's "msot highly valued representational system" as "the representational system the person typically uses to represent the world and his experience to himself."

The Classifying Method

For Bandler and Grinder, language is a reflexive medium which links sensory input with behavioral output in human beings. Individuals identify, frame, and model their sensory experiences with words and linguistic structures (Deep Structures). They use words and sentences (Surface Structures) to express, communicate, or represent these models of their experience to themselves and others. Such language models finally serve as guides for organizing other behaviors.

If an individual's language output reflects his or her language-based models of sensory input, then it is reasonable that Bandler and Grinder should, lacking empirical evidence, posit a linguistic index for determining that individual's "most highly valued representational system." Certain words which people speak or write can be directly traced to sensory input channels or the representational models by which the sensory experiences were organized and stored. According To Bandler and Grinder, if a person attends primarily to the kinesthetic stimuli associated with an event and represents the most salient features of that event kinesthetically, then that individual will tend to use "feeling" verbs, adverbs, and adjectives to describe his or her experience. For example, "She felt badly about the way he held the squirming child." The relative frequency of verbs, adverbs, and adjectives, otherwise called "predicates," serves as the linguistic index for discerning an individual's "most highly valued representational system." A "visual" will use relatively more visual than auditory or kinesthetic predicates in verbal communications (e.g. "They were dazzled as they watched the silver car streak away from the curb."). An "auditory" individual will primarily use auditory predicates (e.g. "They were dumbfounded as they heard the tires squeal suddenly in the quiet street."). By means of this "predicate method," Bandler and Grinder classify individuals as "auditory," "kinesthetic," or "visual" with reference to their "most highly valued representational system."

"Most highly valued representational systems" and their identification by the "predicate method" constitute the first in a series of theoretical building blocks in Bandler and Grinder's Structure of Magic II. If not the corner stone of their therapeutic superstructure, the construct certainly serves as a crucial linkage and support between their linguistic premises and their blueprints for therapy.

> Our experience has been that, when people come to us in therapy, they typically come with pain, feeling themselves paralyzed, experiencing no choices or freedom of action in their lives. What we have found is not that the world is too limited or that there are no choices, but that these people block themselves from seeing those options and possibilities that are open to them since they are not available in their models of the world. (Bandler and Grinder, 1975, 13)

If, according to Bandler and Grinder, individuals do create language-based models of their sensory experiences favoring one representational mode above the others, then that modeling process is an appropriate target for effective therapeutic interventions. Certainly it is important for any therapist to have accurate knowledge about how the client organizes his or her experiences in order to choose the most effective therapeutic intervention whether cognitive, behavioral, environmental, or medicinal. Bandler and Grinder propose an even more direct approach. The distressed client may well ignore information from four of the five sensory channels, thereby unduly limiting perceptions and impoverishing behavioral choices. The Bandler-and-Grinder-trained therapist may discern that client's "most highly valued representational system" by the "predicate method." Further it is recommended that the therapist intentionally match in his or her own speaking the language predicates of the client for accurate empathy and gradually call attention to other representational modes to enrich the client's modeling process and subsequent behavioral choices. In other words, if a therapist knows what representational modes are available to the client in modeling experiences, then the therapist can design therapeutic experiences that will assist the client in altering and enriching his or her modeling process for the sake of behavioral change. Individuals' use of language according to their "most highly valued representational system" thus serves as the medium for diagnostic assessment and therapeutic intervention.

Visual Dominance

In founding their intuitively elegant, if circuitous Structure of

Magic, Bandler and Grinder have omitted empirical evidence for the validity of their construct and their predicate method. Moreover, they have ignored a body of experimental literature which has consistently contradicted their premise that individuals differ in their preferred sensory modalities. Empirical research on sensory and perceptual processes has continually supported the principle of "visual dominance" among humans rather than Bandler and Grinder's notion of individual differences. As early as the 1930's, Gibson (1933) concluded that visual perceptions predominated kinesthetic information (i.e. information arising from skin, joint, and muscle sensations) as subjects with prismatic eye-glasses reported that an objectively straight edge felt curved. More recently, additional evidence has confirmed the tendency of visual perceptions to dominate discrepant kinesthetic perceptions in judgment of object size (Rock and Victor, 1964) and object location (Pick, Warren, and Hay, 1969). The preeminence of visual information over kinesthetic information has also been demonstrated in the memory literature by Posner (1967) and Klein and Posner (1974).

Francis Colavita (1974) reported a series of four experiments designed to measure the reaction times of subjects to visual and auditory stimuli as well as to compare their behavioral responses to simultaneous presentations of both stimuli. Subjects first matched light and tone signals for equivalent intensities. They were then instructed to press one telegraph key when the light flashed and another key when the tone was sounded. Before each of 30 reaction time trials, subjects were told which stimulus would be presented. In this simple task with prior focus of attention, subjects responded faster to auditory than to visual stimuli.

Subjects were then given 30 trials without any announcement of which stimulus would be presented. Interspersed among these random presentations of light or tone signals were five "conflict trials" in which both the light and the tone were simultaneously presented. Without prior knowledge of the stimulus to be presented, mean reaction times to the light were shorter than to the tone in three of the four experiments. The "conflict trials," however, yielded the most significant of Colavita's results. In the 50 "conflict trials" of Experiment I, 49 responses were made to the light. In fact, most subjects were unaware that the tone signal had even been presented. When subjects in Experiment III were alerted to expect "conflict trials," still 47 of the 50 possible responses were to the visual signal. In yet another variation, the tone signal was twice as intense as the light signal, but again there were only 13 auditory responses compared to 97 visual responses during the 110 "conflict trials." Finally, in Experiment IV, subjects were told to expect "conflict trials" and instructed to press the tone key when they occurred. Still the visual responses outnumbered the auditory responses 36 to 24. Thus out of a cumulative total of 270 "conflict trials" under four different conditions, subjects responded to the visual signal 230 times. The obvious prepotency of the visual stimulus effect provided the metal for the coinage of "visual dominance," the principle that humans attend to visual stimuli before and above stimuli of other modalities.

Egeth and Sager (1977) replicated Colavita's initial experiment and confirmed his results. They, then modified his paradigm in five subsequent studies to test the hypothesis that "visual dominance" is sensorily based. The "visual dominance" effect was supported in each instance; yet they offered persuasive evidence for a non-sensory locus of that dominance effect. By altering instructions and procedures, mean visual reaction times could be predictably increased or decreased. They concluded that the degree of "visual dominance" depends on the relevance of the light stimulus for the gauging of attention and further extended their discussion as follows:

> It is interesting to speculate that if a sufficiently high proportion of tone responses were required, perhaps in conjunction with 'attend to ears' instructions, it might be possible to demonstrate a significant auditory dominance effect. . . Vision ordinarily dominates audition (and cutaneous sensitivity as well) because, for still unknown reasons, subjects are disposed to attend to vision, everything else being equal. (p. 84)

Posner, Nissen, and Klein (1976) published a thorough survey and documentation for the principle and theories of "visual dominance" from a body of experimental research based on the measurement of behavioral choices and reaction times to visual and auditory sensory events. "Visual dominance" may be defined as the consistent tendency of human subjects to respond more frequently to visual stimuli than to auditory or kinesthetic stimuli when they are simultaneously presented. While the basis for this visual dominance effect cannot yet be specified with confidence, there is evidence attributing it to attentional or cognitive factors rather than to the "hard-wiring" of the human sensory systems. The evidence from this line of research, then, does not support Bandler and Grinder's notions that some people may be classified as "auditory" or "kinesthetic" rather than "visual" in their "most highly valued representational system."

Comparisons of the Construct and Evidence

Contradictions between Bandler and Grinder's construct and the experimental evidence for "visual dominance" are striking. Are the contradictions apparent or real? Can they be reconciled? With such impressive, opposing evidence, is there any merit in studying the construct of "most highly valued representational system?"

Though the differences between the notion of a "most highly valued representational system" and the evidence for a singular "visual dominance" are considerable, it is important to note at the outset that each draws a common and significant conclusion. Each investigative enterprise agrees that only one sensory system predominates in the human perceptual process. They apparently differ in their determinations of which system is dominant and the extent to which individual differences exist.

The philosophies and methods which undergird the Bandler and Grinder construct and the principle of visual dominance do stand in stark contrast. Philosophically, Bandler and Grinder are clinical theorists. They proceed to develop a comprehensive clinical theory by associating and logically integrating a variety of ideas - their own clinical intuitions, the transformational grammar theory of Chomsky, the philosophies of Gregory Bateson and Bertrand Russell, eclectic evidence from scientific studies, and anayses of major therpeutic models. Constructs are derived and strategies deduced from this well-reasoned superstructure. Colavita and those whose studies have been cited are experimental scientists. They intentionally limit themselves to the observation of empirical phenomena which can be operationally defined, measured, and probablistically related to other empirical phenomena. They proceed inductively through controlled experimentation from specific observations to hypothesized causal relationships. Their methods and interpretations may be supported, further delimited, or redefined through subsequent investigations.

The aims of each theoretical approach also appear contradictory. As clinical psychologists, Bandler and Grinder represent an idiographic perspective. They begin their investigations with the presupposition that individuals are unique and different from each other. They therefore observe the individual in order to discover the lawful relationships between responses that are peculiar to that individual. For example, they attend to one person's use of metaphorical words (i.e. "predicates") in verbal communications. They notice that this individual uses more auditory predicates than visual, kinesthetic, gustatory, or olfactory predicates. Another individual, they observe, uses more visual predicates, and still another uses more kinesthetic predicates. From these individual observations they appeal to their linguistically-based theory and formulate a generalized construct which they call the individual's "most highly valued representational system."

Colavita and his experimental colleagues, on the other hand, follow the nomothetic tradition. They focus on the population rather than the individual and seek to establish general laws and principles which govern psychological and behavioral processes regardless of individual differences. The experimenter is not oblivious to individual differences. He or she carefully selects subjects who will be representative samples of the population as a whole and employs elaborate statistical safeguards to overcome the effects of those individual differences. In Colavita's sensory dominance experiments, to illustrate, representative human subjects were selected. Individual behaviors and reaction times were carefully recorded; however, group means and statistical probabilities for the group were used to reach the significant evidence that humans as a species are "visually dominant."

Although the two orientations and objectives outlined above appear to be mutually exclusive, it is theoretically possible that the idiographic conclusions of Bandler and Grinder and the nomothetic results of Colavita et al. may be entirely compatible. It is plausible that the majority of human beings, but not the entire population, are visually dominant. The subjects in Colavita's samples may indeed be representative of the population, yet in both the simple reaction time trials and the choice reaction time trials certain individuals may have consistently responded faster to the auditory stimulus. The group means by which the results were assessed and interpreted would not explicitly indicate such individual differences. By attending to individual cases, Bandler and Grinder may in fact detect persons for whom the auditory or kinesthetic representational systems are dominant.

It is more difficult to reconcile Bandler and Grinder's construct with Colavita's "conflict trial" results. In Experiments I and III, ten subjects were each given five "conflict trials," that is, auditory and visual stimuli were simultaneously presented. Of fifty possible responses in each experiment, only one auditory response occurred in the first and only three auditory responses were made in the third. In neither experiment is it theoretically possible that even one individual made significantly more auditory responses than visual responses. By Colavita's standards, there was no evidence of a single, auditorily dominant subject in these two studies.

In Experiment II, when the tone intensity was subjectively twice that of the light, only 13 of 110 possible responses were auditory At best, if those responses were made by the same individuals, only two or three of twenty-two subjects might possibly have been classified as auditorily dominant.

In Experiment IV, when ten subjects were each given six "conflict trials" and explicitly instructed to press the auditory key when they noticed simultaneous stimulus presentations, the number of auditory responses increased to 24 of a possible 60. If the same individuals made all twenty-four auditory responses, then as few as four and as many as six of the ten subjects could have been legitimately classified as auditorily dominant even though the group total of 36 visual responses was taken to support visual dominance.

While it is unlikely that the auditory responses to "conflict trials" in Experiments II and IV were actually made by the same subjects, again individual performances remain systematically embedded in group measures under this application of the nomothetic approach.

Questions do arise from the increase of auditory responses to "conflict trials" in Experiments II and IV. Are human beings so visually dominant that even auditorily-biased manipulations cannot overcome their powerful tendency toward visual dominance? Colavita affirms that interpretation. On the other hand, may the visual dominance effect occur under the limited conditions of Colavita's experimental paradigm, but not under more complex and more life-like conditions? A proponent of the idiographic approach might well subscribe to the Bandler and Grinder construct contending that "auditories," "visuals," and "kinesthetics" alike may simply rely on visual cues when they are asked to do nothing more demanding than to press one of two telegraph keys in response to the onset of a light or tone. Or again, is it possible that there is only one auditorily dominant individual for every nine visually dominant people? Neither Colavita nor Bandler and Grinder offer information about possible ratios. To date, no attempts to answer these questions are available in the literature.

A final area of potential convergence between these two investigative enterprises lies in the common attempts of Bandler and Grinder and Colavita to relate human behaviors to neurological substrata. Bandler and Grinder posit the reflexive medium of language as a key variable between an individual's sensations and behaviors. Words and sentence structures, according to their theory, determine which incoming sensory impressions will be framed and organized for behavioral guides.

Colavita (1975) postulated that "hard-wiring" differences between the auditory and visual sense systems in humans might account for the visual dominance effect resulting from his experiments. After the subsequent experiments of others who replicated his visual dominance effect, but marshalled evidence for its non-sensory locus, he conducted a second series of experiments in 1979, and acknowledged that visual dominance was attributable to ill-defined "attentional factors."

Both positions thus postulate hypothetical, cognitive variables between the neurological and behavioral functions of human beings. Neither makes those connections explicit. It is theoretically possible that Bandler and Grinder's linguistic variable may function as one of the attentional factors to which Colavita defers.

Construct Validity Study

The purpose of this study is not to pit directly the construct of "most highly valued representational system" against the principle of "visual dominance." Nor is the intent to uncover "missing links" between human sensation, perception, and behavior. Rather, the primary object of this investigation is to evaluate the adequacy of Bandler and Grinder's construct and predicate method in discriminating auditory and visual perceptual behaviors among human beings.

Can human subjects be classified as "auditory" or "visual" in terms of their "most highly valued representational system" by tabulating communicated verbs, adverbs, and adjectives (the predicate method)?

Bandler and Grinder's theoretical definitions tend to be broad and inclusive rather than precise and operational. Their "kinesthetic representational system" specifically is excluded from the first research question because "kinesthetic" encompasses such a wide range of so-called "feeling" sensations that it defies operationalization. Only auditory and visual verbalizations and behavioral choices will be considered for assessment.

Bandler and Grinder classify individuals as "auditory," "visual," and kinesthetic" without indicating the relative incidence of each predominant representational system among the people they have observed. Since their discrete, nominal categories are described as "major representational systems," it could be assumed that in reasonably large, random samples of people, a number of individuals would be designated for each classification. On the other hand, Colavita's evidence suggests that auditorily dominant subjects may be rather rare or at least difficult to identify in a general population.

In order to determine the possible distribution of Bandler and Grinder's three "major representational systems" among people and to increase the likelihood of obtaining classifiable subjects for this study, a preliminary screening instrument was employed.

The screening device, a "First Impressions Inventory," was designed on the basis of Grinder and Bandler's (1975) own presentation of the ways that printed words can elicit sensory experiences. In their "Representational Systems" section, for example, they write: "We may choose to close our eyes and create a visual image of a red square shifting to green and then to blue. . ." After similar rehearsals for each sensory system, they conclude:

> Some of you may have noticed that, while reading through the descriptions of the above paragraph, you actually experienced seeing a particular color or movement; feeling hardness, warmth, or roughness; hearing a specific sound; experiencing certain tastes or smells. Some of them were more detailed and immediate for you than others. For some of the descriptions you may have had no experience at all. These differences in your experiences are exactly what we are describing. Those of you who had

> a sharp, clear <u>picture</u> of some experience have a rich, highly developed, visual representational system. Those of you who were able to develop a strong <u>feeling</u> of weight, temperature, or texture have a refined, highly developed kinesthetic representational system. And so on with the other possible ways associated with our five senses that we, as humans, have of representing our experiences. (Grinder and Bandler, 1975, p. 6-7)

Accordingly, the printed "First Impressions Inventory" included words, phrases, and sentences which would elicit sensory experiences. Eight of the descriptive presentations contained auditory predicates, eight had visual predicates, and eight were constructed with kinesthetic predicates. Potential subjects indicated their immediate preference among each set of three presentations. Finally, as Bandler and Grinder recommend, they reported which of the three sensory modes they employ in trying to remember events effectively. Individuals making six or more of the nine possible choices to either auditory or visual predicate modes were tentatively classified as "highly auditory" or "highly visual" candidates for this study.

Data from the screening instrument should positively correlate with data from the taped interview according to Bandler and Grinder's schema of the perceptual process. Input Channel (sensations) - Representational System (Deep Structure linguistic perceptions) - Output Channel (Surface Structure communications) The screening device presents carefully structured sensory predicates to the input channels of subjects for their conscious preferences. The interview elicits unstructured verbal behavior from the subjects whose sensory predicates are systematically assessed. Bandler and Grinder's theory commends both predicate measures as conscious indices of an individual's "most highly valued representational system."

The primary question is whether subjects can be classified as "auditory" or "visual" by Bandler and Grinder's predicate-output method. The secondary question is whether an alternate predicate-input method will be positively correlated with the predicate-output method.

The first two questions for investigation are framed within the theory and procedures of Bandler and Grinder. A third question emerges relating their constructs to empirical evidence beyond their own system or theoretical structure. Bandler and Grinder's examples and explanations consistently imply that individuals who express their experiences through one "most highly valued representational system," also rely most heavily on that particular sensory system in attending to and perceiving events. If subjects can be differentially classified by the "predicate method" with reference to their "most highly valued representational systems," will those who are classified as auditorily or visually dominant vary significantly from each other in attending and responding to simultaneous presentations of auditory and visual stimuli in "conflict trials" similar to those in the Colavita paradigm? In other words, will there be evidence supporting the construct of multiple "most highly valued representational systems" derived from inductive or experimental methods which diverge from the Bandler and Grinder approach?

The "conflict trial" portion of Colavita's experimental design recommends itself as a test of initial selective attention. In Colavita's first experiment, no modality-biased attentional instructions were given. An auditory stimulus and a visual stimulus were simply presented simultaneously. Subjects were requested and trained to respond as rapidly as possible to both auditory and visual stimulus presentations by pressing one of two telegraph keys. Although Colavita's paradigm was chronometric because he was interested in differential response latencies, he found that subjects initially and many times exclusively attended to the visual stimulus in the "conflict trials."

For the purposes of this study, reaction times to different presentations will not be considered. Only the behavioral choices of subjects will be targeted. Given two simultaneous and equivalent stimuli, do subjects differ in their initial selection of the stimulus to which they attend? Support would be lent to Bandler and Grinder's construct of different "most highly valued representational systems" if significant variation in the responses of those classified as "auditory" and "visual" subjects were to be detected. Specifically, Bandler and Grinder would expect "auditory subjects to attend more to auditory stimuli and "visual" subjects to respond more to visual stimuli.

Discrepant trial responses will provide the data for determining whether there is further evidence for the visual dominance principle or whether Bandler and Grinder's "auditory" and "visual" classifications are method-specific.

One further line of investigation will be attempted in this experiment. namely, the possible effect of task complexity on attentional responses.

As noted earlier, Colavita combined light and tone stimuli in his "conflict trials." By this method he hoped to locate the visual dominance effect in the neurological differences between the visual and auditory sensory systems. Unable to support a sensory locus, he yielded to hypothesized "attentional factors" such as central alerting, habitual compensation, and attentional strategies. (Posner and Nissen, 1976)

Bandler and Grinder begin with the notion of a mediating variable which determines an individual's representational and attentional preferences. Verbal language is proposed as the reflexive medium which molds incoming sensations into perceptual categories which then serve as "maps" or representational guides for behavioral outputs. Differentially-developed and sensorily-associated language modes influence the ways individuals attend to phenomenal events and access organizable information from them. Thus, an individual's "most highly valued representational system" may be described as an "attentional factor" in Bandler and Grinder's schema.

While the primary or dominant representational system may be a selective factor in attention to many, continuous, and complex sensory phenomena, it may be less salient or only minimally employed when subjects attend to a series of simple stimulus presentations in a controlled laboratory experiment. If linguistic stimulus elements were used instead of a light and tone and attentional tasks became more difficult would subjects increasingly resort to their dominant representational system in selectively accessing linguistic information?

In this experiment, stimulus complexity will be varied by the use of verbal language symbols in series of increasingly difficult tasks. The seventy-five stimulus presentations will be divided into five series of fifteen trials each. Beginning with a relatively simple recognition task, the experimental treatments will include memory tasks and finally a reordering task requiring singularly focused attention. A word-recognition task will conclude the procedure. In each of the five series, one third of the trials will involve discrepant stimuli presentations, i.e. the symbols presented visually will not correspond with the symbols presented auditorily.

It is hypothesized that if the language-based representational systems of Bandler and Grinder influence selective attention, "visual" subjects should increasingly rely on visual information sources during the course of the five treatment while "auditory" subjects respond increasingly to auditory stimuli.

In summary then, the questions of this study are:

1) Can human subjects be classified as "auditory" or "visual" with reference to Bandler and Grinder's construct of a "most highly valued representational system" by their "predicate method" of tabulating communicated verbs, adverbs, and adjectives?

2) Will subjects who, through a Bandler-and-Grinder-based screening instrument, are designated as "highly auditory" or "highly visual" also be classified as "auditory" or "visual" by means of their predicate choices in recorded verbal behavior? In other words, are the "input" measures of the "most highly valued representational system" positively correlated with "output" measures of the same construct as Bandler and would expect?

3) Will subjects classified as "auditory" or "visual" by the Bandler and Grinder methods vary significantly in their attentional responses to

simultaneous, but discrepant presentations of auditory and visual stimuli?

4) Will the tendency of "auditory" subjects to respond to auditory stimuli while "visual" subjects respond to visual stimuli increase as stimulus and task complexity is increased?

Results yielding positive answers to these questions will tend to support the validity of the Bandler and Grinder constructs. Negative results will raise serious questions about their constructs, their measurement of those constructs, and the theoretical structure which they currently support. Results that indicate a visual dominance effect will support Colavita's conclusions and also provide evidence for the robustness and generalizability of the visual dominance principle.

METHODOLOGY

Screening and Selection of Subjects

Subjects for this experiment were solicited from students attending an undergraduate Psychology of Adjustment class at Louisiana State University.

Volunteers were screened by means of a "First Impressions Inventory" (Appendix A). This screening instrument was designed for the purpose of detecting subjects most likely to be classified as "auditory" and "visual" according to Bandler and Grinder's predicate method. Instead of eliciting verbalized predicates from each volunteer individually, predicates were presented to the potential subjects for forced choices. Volunteers were asked to indicate eight preferences from among twenty-four presentations of various words, phrases, and sentences. Predicates (verbs, adverbs, and adjectives) associated with auditory, visual, and kinesthetic sensory systems were embedded in twelve phrases, six sentences, and six nominalized verbs. Eight of the printed presentations were allocated to each of the major sensory modalities. Volunteers were asked to pick presentations they subjectively considered most vivid and engaging. The ninth presentation was a self-reporting sentence-completion task by which subjects indicated the sensory mode they thought they preferred for most effective remembering.

The predicate presentations and the screening instrument were extracted from the published examples and exercises recommended by Bandler and Grinder for practice in discerning individual's "most highly valued representational system."

In order to obtain enough subjects with definite preferences for either the auditory or visual predicate mode, those who gave six or more of the nine possible responses to either auditory or visual predicate presentations were selected as "highly auditory" or "highly visual."

These subjects were informed of their selection as well as their freedoms to discontinue the experimental procedure at any time. They were invited to meet in groups of five or less on two successive afternoons. The site of the experiment was the Louisiana State University Psychology Department Laboratory where, in a small room, five desks were arranged in a staggered fashion approximately equidistant from a television set. Subjects were given a pen and an answer sheet (Appendix B) on which they were asked to write their age, sex, and student classification without further instructions.

Materials

"First Impressions" was selected as the title of both the screening instrument and the experiment itself for two reasons. First, it was designed as an attempt to develop an attentional expectation and focus among subjects so that their responses would be defined as immediate rather than reflective. Secondly, while the title accurately targets the behaviors of interest, it does not reveal the complete purpose and rationale of the procedure and thereby is intended to minimize experimenter effect.

The experimental presentation was standardized through an audio-visual tape (Scotch UCA20S Videocassette) produced by the Louisiana

State University Instructional Resources Center. A female assistant was adequately but not entirely informed of the experimental design. Via the sixteen-minute tape, she informed and instructed the subjects before each of five experimental presentation series.

The first four series of the experimental stimuli consisted of lower case consonants - b, d, g, p, and t as well as the numerals 1, 2, 3, 4, 5, 6, 8, and 9. Visuals of these symbols were prepared for video taping with one inch, white vinyl, Gothic characters produced by ZIPPY-SIGN to be legible at a distance of fifty feet. The white characters were centered on 6"x 8" rectangles of black construction paper for black and white presentations on a 17" television screen. The auditory presentations of these symbols were vocalized by the assistant who would, for example, sound a "b" as the letter "b" was presented on the screen during the congruent trials. In discrepant trials, the assistant might sound a "b" as the letter "d" was visually being presented. Each series was made up of ten congruent trials and five discrepant trials. Discrepant trial presentations were very carefully edited so that both onset and offset were simultaneous. The range of error during these presentations did not exceed four frames per second on the thirty-frame-per-second tape.

In the first two experimental series of presentations, the consonants b, d, g, p, and t were selected because of the similarities in their visual shape and verbal production (Mynatt, 1977). In the first and simplest series of presentations, a single letter was simultaneously presented auditorily and visually during congruent trials. During discrepant trials, for example, an auditorily sounded "b" and a visually presented "d" would have fewer distinguishing characteristics than letters such as "w" and "h". Subjects attending to one mode might not even discern the discrepancy in the other mode.

In the second series, the complexity of the subjects' task increased from the simple recognition of a single letter to the recall of a series of three consonants. The sequential auditory presentation at one-second intervals might be "g-b-p" while the simultaneous visual presentation might be "g-p-b" on the discrepant trials. The ambiguity of the consonant presentations would thus be maintained.

In the third series, the complexity was further increased to the recall of four digits, however more distinct numerals such as "3-8-5-9" were employed. By this stage, most subjects would probably be aware of the discrepancy in some presentations. They would probably resort to their preferred mode for accessing such information.

The fourth series was designed as the most complex task. Three numerals were simultaneously presented for reverse ordering. On congruent trials the task would still be relatively simple. However, on discrepant trials subjects would have to rely on one sensory mode or the other to complete the task successfully as instructed.

The final series of presentations consisted of one and two syllable words which were linguistically meaningful. On discrepant trials, only the first consonant letter of each word was discrepant. For example, the word "pout" was auditorily sounded as the word "bout" was visually presented. Subjects who by this stage of the experiment were aware of discrepant presentations in each series would be more actively attentive for such occurrences in the final series and would be inclined to rely on the first impressions of their preferred sensory mode.

A pilot presentation of only visual stimuli was made to set the video brightness and contrast at levels by which all subjects could accurately complete the tasks in the visual mode. Similarly, the vocalized auditory stimuli were presented to another group without the visual stimuli to set the tone and volume so that subjects who attended to the auditory mode only could successfully complete the tasks required.

Procedure

> Welcome to our experiment on "first impressions." You have been given a pen and a sheet of paper on which to write your first impressions. As you can tell from the paper, there will be a series of five experimental presentations. The first series of presentations will be relatively easy. The following series will increase in difficulty. It is important that you pay attention and do the best you can. Fill in the blank on each presentation even if you become confused or frustrated. Also, be careful not to distract other people by saying anything or moving around. They, too, will be doing their best. You will have questions and they will be answered. But not until the debriefing period after the experiment is completed. Again, do the best you can.
>
> Since this is an experiment on first impressions, it is important that you work as rapidly as you can, and not change any of your answers. Also, it is important that you not go back to previous presentations in order to give second impressions.
>
> During the first series of presentations you will notice letters of the alphabet. There will be fifteen presentations of various, single letters at three-second intervals. Please write the letter you notice on each line of column I. Do the best you can as quickly as you can without asking any questions or skipping any blanks. Ready?

Subjects were then treated to the following fifteen trials of simultaneous auditory and visual presentations. The asterisks denote the five randomly embedded discrepant trials.

	Auditory	Visual
1)	t	t
2)	d	d
3)	b	b
*4)	b	d
*5)	d	b
6)	p	p
7)	g	g
*8)	p	b
9)	g	g
10)	d	d
11)	b	b
*12)	g	t
*13)	d	p
14)	t	t
15)	p	p

Thank you. During the second series of presentations you will again notice letters of the alphabet. This time, three letters will be presented one at a time. After all three letters have been presented, write the letters you first notice in the appropriate spaces under column II. Do not begin writing until the third letter has been presented. Then write quickly what you remember. For example, after you notice g-t-b, you would write g-t-b. Fifteen presentations will now occur at eight-second intervals. Ready?

Subjects were then treated to the following fifteen trials of simultaneous auditory and visual presentations. The asterisks denote the five randomly embedded discrepant trials.

	Auditory	Visual
1)	b-d-g	b-d-g
2)	g-g-g	g-g-g
*3)	g-b-p	g-p-b
4)	g-d-b	g-d-b
5)	p-t-p	p-t-p
*6)	t-p-d	t-d-p
7)	d-p-p	d-p-p
*8)	t-d-b	t-b-d
9)	b-d-p	b-d-p
*10)	g-b-b	g-p-p
11)	d-d-d	d-d-d
*12)	d-p-d	d-b-p
13)	t-p-b	t-p-b
14)	g-d-g	g-d-g
15)	t-p-t	t-p-t

> Thank you. During the third series of presentations you will notice numbers. Four numbers will be presented at one time. After all four numbers have been presented, write the numbers you first noticed in the spaces provided under column III. For example, 1-2-3-4 would be written 1-2-3-4. Work quickly and do the best you can. Be sure to fill in all the spaces provided even if you are unsure in recalling the numbers. Fifteen presentations will now occur at ten-second intervals. Ready?

Subjects were then treated to the following fifteen trials of simultaneous auditory and visual presentations. The asterisks denote the five randomly embedded discrepant trials.

	Auditory	Visual
1)	8-9-6-3	8-9-6-3
2)	1-3-3-1	1-3-3-1
3)	6-4-8-2	6-4-8-2
*4)	8-5-4-9	8-4-5-9
5)	2-1-2-9	2-1-2-9
*6)	6-3-5-1	6-5-3-1
7)	5-3-8-9	5-3-8-9
*8)	2-4-9-3	2-9-4-3
*9)	3-9-6-1	3-6-9-1
10)	4-9-6-9	4-9-6-9
11)	9-2-1-4	9-2-1-4
12)	8-8-5-3	8-8-5-3
13)	3-2-4-1	3-2-4-1
14)	2-3-5-3	2-3-5-3
*15)	1-8-4-9	1-4-8-9

Thank you. During the fourth series of presentations you will again notice numbers. Only three numbers will be presented. However, this time we ask that you write all three numbers backwards or in reverse order. For example, 9-2-6 would be written 6-2-9 and 4-8-3 would be written 3-8-4. You may have difficulty in this series because some of the presentations will be intentionally confusing. Do the best you can. Be sure to fill in each blank of column IV with your first impressions. Work as rapidly as you can. Fifteen presentations will now occur at nine-second intervals. Ready?

Subjects were then treated to five trials of alternating visual of auditory presentations as practice trials. The last ten presentations were auditorily and visually simultaneous.

	Auditory	Visual
1)		2-4-8
2)	5-6-9	
3)	3-9-3	
4)		6-2-9
5)	4-2-3	
6)	9-8-6	9-8-6
*7)	3-5-9	3-5-8
*8)	4-9-1	4-9-2
9)	2-1-6	2-1-6
10)	3-2-5	3-2-5
*11)	6-1-3	6-3-1
*12)	8-2-5	8-5-2
*13)	9-6-4	3-8-5
14)	1-5-6	1-5-6
15)	8-3-9	8-3-9

Thank you. During the final series of presentations you will notice words presented in six-second intervals. Please write the word you first notice on each line of column V. Work quickly. Do the best you can. Don't worry about spelling the words correctly. Be sure to fill in each blank. Ready?

	Auditory	Visual
1)	gear	gear
2)	dig	dig
*3)	bang	pang
*4)	tattle	battle

5)	park	park
6)	grain	grain
7)	darted	darted
8)	bold	bold
*9)	pout	bout
*10)	taunted	daunted
11)	grade	grade
12)	tower	tower
13)	pest	pest
14)	damper	damper
*15)	bend	pend

Thank you very much for your cooperation. We would like to talk with you about your impressions of this experiment and then explain the experiment fully to you. Would you please go with one of the assistants for a taped debriefing interview? You may hand them your paper and pen.

We want to assure you that whatever you have written on your paper and whatever you say in the debriefing interview will be strictly confidential and used only for the purposes of this experiment.

Thank you again for your willing participation.

After subjects had completed the audio-visual experimental presentation, each was introduced to an assistant experimenter who accompanied each individual to another small room for a tape recorded interview and debriefing. The assistants were trained to ask the questions below with minimal nonverbal cues. The questions were constructed to exclude any sensory predicates which might bias responses. Their purpose was to elicit maximum verbal communication, which would later be analyzed for predicate content.

Pretend that you are now leaving the Psychology Lab. One of your friends meets you in the hall asking, "You just finished that experiment, didn't you? What was it like?" Supposing your friend was really interested in your impressions, how would you describe what you experienced during the last sixteen minutes from beginning to end?

Would you add something more to help your friend to understand a little better? Anything else? Okay.

How would you describe your impressions of the person who presented the experimental tasks? What did you notice about her? Anything else? Okay.

What difficulties did you encounter during the experiment? Anything else? Okay.

If your friend asked you what you thought the experiment was about, what would you say? Anything else? Okay.

What did you notice during the experiment that gave you those impressions? Anything else? Okay.

During the experimental tasks would you say that you relied more on your eyes or on your ears?

Now, do you have any questions about the experiment? Anything else?

There were 25 trials when the visual presentation was different from the auditory presentation. Did you notice any of those?

What did you think to yourself when you noticed them?

What did you do when you noticed them?

I will be happy to explain the experiment as best I can. Would you agree not to tell anyone anything about it until after Friday since some of your friends or your friends' friends may be doing the experiment also?

Scoring

Three dependent variables were scored - predicate preferences on the "First Impressions Inventory," predicate productions of subjects during the taped interviews, and written responses to twenty-five discrepant stimulus presentations.

Frequencies of nine predicate preferences were tabulated for the "First Impressions Inventory." A person received three scores according to the number of choices he or she made among the auditory, visual, or kinesthetic predicate structures. For example, one individual might receive scores of 2/7/0 with reference to auditory/visual/kinesthetic preferences. Another might be scored 6/1/2 by the same ordering. The first person would be considered "highly visual" while the second would be classified as "highly auditory." One had to score at least six of the nine responses in either the auditory or visual modes in order to be considered as potentially "auditory" or "visual" subjects for this experiment. Scores of 5/3/1 or 2/5/2 were thereby excluded.

The verbs, adverbs, and adjectives produced by "highly auditory" and "highly visual" subjects during their interviews were transcribed from tape to paper. These predicates were then considered for classification as auditory, visual, or kinesthetic according to their sensory associations. Predicates which did not fit these three major categories were classified as either "other-sensory" or "non-sensory." Predicates were then tabulated. A ratio score was derived by dividing the number of predicates in the dominant category by the total number of sensory predicates produced. Thus, a subject who used twenty auditory predicates in a total of thirty sensory predicates would be scored as ".66-Auditory."

Since Bandler and Grinder offer no criteria for determining which representational system is most highly valued according to their predicate method, the initial, tentative criterion employed was a simple majority percentage. Of the total sensory predicates communicated by a subject, at least fifty-one percent had to be either auditory or visual before the subject could be classified as "auditory" or "visual" with reference to his or her "most highly valued representational system."

Attentional responses to the twenty-five discrepant stimuli presentations were scored for each of the five series in which they occurred. Five discrepant presentations were randomly embedded in each series of fifteen trials. The subject's response to each discrepant trial was tabulated as either "auditory" or "visual." In each series, then, five possible tabulations were scored according to the frequency of visual responses. A subject's score could range from zero to five. A score of 0 or 1 on any task would indicate a clearly auditory attentional set of responses. A score of 4 or 5, conversely, would identify a visual response tendency. Scores of 2 and 3 would reveal no definitive auditory or visual tendencies. A subject, thus, would receive five attentional response scores for five series of discrepant stimuli presentations.

RESULTS

Forty-one subjects were selected for this experiment from the 221 students who completed the screening instrument. Twenty-two of these subjects were screened as "highly auditory" by having chosen six or more auditory predicates from the nine predicate presentations. Nineteen, by their choices of visual predicates, were designated as "highly visual." Seventeen subjects were male, and twenty-four were female. Eleven subjects were classified as sophomores, twenty as juniors, and ten as seniors. The mean age of subjects was 21.5 years with a range of 18 to 34 years.

Predicate Classification Method

In order to answer the question whether subjects could be classified as "auditory" of "visual" by Bandler and Grinder's "predicate method," the verbs, adverbs, and adjectives expressed by subjects during their post-treatment interviews were analyzed. Two judges versed in the Bandler and Grinder method tabulated predicates as non-sensory, sensory, auditory, kinesthetic, and visual. The inter-rater reliability of these judges was .96. Discrepant scorings were resolved by consultation and mutual agreement.

The forty-one subjects expressed from 25 to 318 predicates per interview with a mean predicate production of 98.12 (SD=61.58). On the average, subjects expressed considerably more non-sensory predicates ($\bar{X}$=75.32, SD=52.91) than sensory predicates ($\bar{X}$=22.8, SD=11.92).

When the 51% criterion was employed (see page 36), only ten subjects were classified by the predicate method. Of the twenty-two subjects designated as auditory on the screening instrument, three were classified as auditory and three were classified as visual by this predicate method. Of the nineteen subjects screened as visual, two were classified as auditory and two were classified as kinesthetic by this predicate method.

A review of the data suggested that the criterion percentage be shifted to 45% provided that the frequencies of the dominant predicate category exceed those of the second most frequent category by 18%. Employing the 45% criterion, eighteen of the forty-one subjects were classified as sensorily dominant. Nine were designated as auditorily dominant, two as kinesthetically dominant, and seven as visually dominant.

Table 1 presents the predicate frequencies of subjects screened as "highly auditory." Predicate categories distinguish non-sensory from sensory predicates and then display the sensory predicates according to their specific auditory, kinesthetic, and visual systems. Dominance designations refer to one of the three sensory-specific categories listing with a letter the category with the highest frequencies. The last column represents the proportion of dominant frequencies to the total of the sensory predicate frequencies.

Table 2 provides the same information for those subjects screened as "highly visual." The frequency data used for the predicate method analysis of all forty-one subjects is thus presented.

According to Bandler and Grinder (1975), "A most highly valued representational system can be identified by listening to the natural language predicates used by a person in describing his experience." (p.25)

Table 1

Predicate Frequencies of "Highly Auditory" Subjects

#	Non-sensory	Sensory	Auditory	Kinesthetic	Visual	Dominance	%
1	33	16	3	0	12	V	.75*
2	32	16	5	3	7	V	.44
6	74	34	13	6	11	A	.38
8	37	24	6	5	11	V	.46*
11	25	7	4	2	0	A	.57*
16	47	8	1	2	5	V	.63*
17	148	38	8	13	17	V	.45
18	78	18	6	1	11	V	.61*
22	59	9	6	1	2	A	.66*
25	59	31	13	4	13	A	.42
27	81	22	3	9	9	V	.41
28	55	22	8	6	8	A	.36
29	65	27	8	9	10	V	.37
30	62	20	11	6	3	A	.55*
31	36	13	6	2	3	A	.46*
33	87	31	8	9	10	V	.32
35	78	24	10	3	9	A	.42
36	103	28	6	12	10	K	.43
38	34	14	7	2	5	A	.50*
40	19	6	3	0	3	A/V	.50
41	78	15	6	2	4	A	.40
42	80	30	12	11	6	A	.40

* Classified by 45% criterion

Table 2

Predicate Frequencies of "Highly Visual" Subjects

#	Non-sensory	Sensory	Auditory	Kinesthetic	Visual	Dominance	%
3	67	31	9	7	15	V	.48*
4	60	18	4	13	1	K	.72*
5	207	42	12	10	19	V	.45*
7	108	40	16	11	9	A	.40
9	33	20	9	3	6	A	.45*
10	28	12	6	1	4	A	.50*
12	36	21	9	5	7	A	.43
13	124	28	14	2	12	A	.50
15	245	73	28	18	23	A	.38
19	57	20	8	3	9	V	.45
20	64	15	9	1	2	A	.60*
21	81	10	3	6	1	K	.60*
23	32	14	8	2	4	A	.57*
24	43	17	7	4	6	A	.41
26	231	23	3	4	11	V	.48*
32	68	17	8	5	4	A	.47
34	48	20	9	2	7	A	.45
37	126	31	8	13	10	K	.42
39	60	30	11	4	13	V	.43

*Classified by 45% criterion

In this study, only 24% (by the 51% criterion) to 44% (by the 45% criterion) of the subjects interviewed could be classified according to the predicates they used to describe their experiences.

Relationship Between "Input" and "Output" Predicate Classifications

It was hypothesized that subjects classified as either "highly auditory" or "highly visual" by means of the Bandler-and-Grinder-based screening instrument (a predicate preference or "input" method) would subsequently also be classified as "auditory" or "visual" according to Bandler and Grinder's predicate ("output") method. In order to determine the degree of relationship between screening classifications and predicate method classifications, the screening classifications of "highly auditory" and "highly visual" were examined in relation to the ratio of auditory predicate frequencies to the sum of auditory and visual predicate frequencies. A point biserial correlation was calculated. The correlation between screening classifications and auditory predicate proportions expressed in the interviews was low ($r=.135$) and not significantly different from zero ($t=.269$). Since no relationship was found between the "inupt" and "output" measures, the hypothesis was no confirmed.

Further indication of a lack of relationship between these two measures of "most highly valued representational systems" can be seen in Table 3 which presents correspondences between the classifications of each method. Using a 45% criterion for the predicate method, only five of the ten subjects classified as auditory by the screening instrument were correspondingly identified. Two of the eight subjects screened as visual were correspondingly classified by the predicate method. Overall, seven

Table 3

Classifications Correspondence

Screening Classification	Predicate Method Classification (45% criterion)		
	Auditory	Visual	Kinesthetic
Auditory	5	5	0
Visual	4	2	2

of eighteen subjects were classified alike for a hit-ratio of .39.

Even though subjects screened as "highly auditory" or "highly visual" were not correspondingly classified as "auditory" or "visual" by the analysis of their interview predicate productions, one would expect according to Bandler and Grinder's construct that "highly auditory" subjects would verbalize more auditory predicates than "highly visual" subjects. Conversely, "highly visual" subjects would be expected to express more visual predicates than "highly auditory" subjects.

Contrary to expectations, subjects screened as "highly auditory" expressed fewer auditory predicates ($\bar{X}$=6.68) than those screened as "highly visual" ($\bar{X}$=9.53). A comparison of means yielded no significant differences between the groups ($t[39]=.76$). The mean visual predicate productions of the "highly auditory" ($\bar{X}$=7.73) was similar to that of the "highly visual" ($\bar{X}$=8.58). Again, this difference was not significant ($t[39]=.31$). Screening classifications are not reflected in actual predicate production.

Finally, instead of an arbitrary criterion, a median split was used to classify subjects according to the predicate method. Using the ratio of auditory frequencies to the sum of auditory and visual frequencies as a criterion, eliminated four subjects classified as kinesthetic. A contingency table (Table 4) shows the relationships between the screening classifications and the median-split classifications of the predicate method. 12 of 20 subjects screened as auditory were likewise classified as auditory by the predicate method. 6 of 17 subjects screened as visual were correspondingly identified by the predicate method. The frequency

Table 4

Classifications Contingencies

Screening Classification	Predicate Method Classification (Median test criterion): Auditory	Visual
Auditory	12	8
Visual	11	6

of corresponding classifications was analyzed using a contingency formula for a chi square statistic (Edwards, 1973). There was no significant relationship between the two methods of classification ($\chi^2[1]=.087$).

In summary, relatively few subjects were clearly classified according to the predicate method by either the 51% or 45% criteria. The classifications made by the predicate method were not correlated with screening classifications. There is no evidence that the screening instrument was predictive of predicate productions. In fact, subjects screened as "highly auditory" or "highly visual" did not differ significantly in their predicate productions.

Attentional Responses Analysis

The third question asked whether subjects classified as auditory or visual by the predicate method would differ also in their attentional responses to the simultaneous, but discrepant presentations of auditory and visual stimuli.

By the 45% criterion, the predicate method classifed too few subjects for the purpose of this test. Therefore an even less stringent criterion was employed. Subjects were classified by the ratio of auditory predicates to the sum of auditory and visual predicates. Those subjects whose auditory/auditory + visual predicate ratio was less than .50 were classified as visual. Those subjects whose auditory predicate production ratio exceeded .50 were classified as auditory. By this auditory ratio criterion, twenty-three subjects were classified as auditory and fourteen were designated as visual.

In order to determine whether subjects so classified by the predicate method would differ significantly in their attentional responses, a 2 x 5 repeated measures ANOVA was performed. There were two levels of dominance (auditory and visual) and five levels of experimental tasks increasing in complexity and difficulty. The dependent measure was the frequency of visual responses on discrepant trials for each series of tasks. Since a subject could make from 0 to 5 visual responses in each of the five series, scores of 0 and 1 were considered distinctly auditory while scores of 4 and 5 were considered visual.

The analysis of variance is summarized in Table 5. It was expected that visual subjects would make more visual responses than auditory subjects. The auditory group mean of 4.65 for trial series, however, was slightly higher than the mean for the visual group, 4.59. The main effect for dominance was not significant ($F[1,35]=.07$).

There were no expectations for a significant treatment effect due to the differences in the levels of task difficulty, and none were found ($F[4,140]=1.27$). Means of 4.30, 4.60, 4.68, 4.81, and 4.76 across the five series of tasks were consistently high indicating distinctly visual preferences in attentional responses.

The dominance x treatment interaction however was significant ($F[4,140[=2.65$, $p < .05$) revealing that auditory and visual subjects did differ in their attentional responses across trials. This interaction will be discussed later.

Table 6 displays the visual response frequencies, means, as well as proportions of visual responses to the total responses for subjects classified as auditory by the predicate method (auditory ratio criterion).

Table 5

Analysis of Variance for Visual Choices on Discrepant Trials

Source	DP /	SS	F Value	Probability of F
Dominance	1	.19	.07	
Error	35	97.87		
Treatment	4	3.27	1.27	
Dominance x Treatment	4	6.84	2.65	$p < .05$
Error	140	90.34		

Table 6

Frequencies of Visual Choices by "Auditory" Subjects

#	Pre-classification	Trial Series 1	2	3	4	5	Sum
6	A	0	2	4	5	4	15
7	V	0	5	5	5	5	20
9	V	5	5	5	5	5	25
10	V	5	5	5	5	5	25
11	A	5	4	5	5	5	24
12	V	5	5	5	5	5	25
13	V	5	5	5	5	5	25
15	V	0	4	1	5	5	15
20	V	2	4	5	5	5	21
22	A	5	5	5	5	5	25
23	V	5	5	5	5	5	25
24	V	5	5	5	5	4	24
25	A	5	4	5	5	5	24
28	A	5	5	5	5	5	25
30	A	5	5	5	5	5	25
31	A	5	5	5	5	5	25
32	V	4	4	5	5	5	23
34	V	5	5	5	5	5	25
35	A	3	5	5	5	2	20
38	A	5	5	5	5	5	25
40	A	4	5	5	5	5	24
41	A	5	5	5	5	5	25
42	A	5	5	5	5	5	25
	Total	93	107	110	115	110	535
	Mean	4.04	4.65	4.78	5.00	4.78	23.26
	Ratio	.81	.93	.96	1.00	.96	.93

Table 7 presents the same data for those subjects classified as visual by the same method. These tables demonstrate the highly visual attentional responses across tasks by individuals in both groups. Regardless of their predicate method classifications, thirty-six of the thirty-seven subjects responded more to the visual stimulus than to the auditory stimulus during discrepant stimuli presentations. Only one subject made distinctly auditory responses, and that subject was not classifiable by the predicate method under the 45% criterion.

In summary, subjects' attentional responses to simultaneous and discrepant stimuli presentations were clearly visual despite their differential classifications as auditory or visual by the predicate method.

Relationship of Attentional Responses to Task Complexity

An exploratory hypothesis predicted that subjects would increasingly respond according to their dominant sense system as tasks increased in complexity or difficulty. "Auditory" subjects were expected to make progressively more auditory responses (i.e. fewer visual responses) as tasks became more complex. Conversely, "visual" subjects were expected to increase their visual responses as each of the five series of tasks became increasingly difficult.

A significant dominance x treatment interaction, $F(4,140)=2.65$, $p < .05$, would seem to support this hypothesis. The pattern of means across the five series of tasks, however, is not consistent with the hypothesis. As can be seen in Figure 1, "auditory" subjects did make slightly fewer visual responses ($\bar{X}=4.04$), as expected, than did "visual subjects ($\bar{X}=4.71$) during the first series of tasks. However, contrary to prediction,

Table 7

Frequencies of Visual Choices by "Visual" Subjects

#	Pre-classification	Trial Series 1	2	3	4	5	Sum
1	A	5	5	5	5	5	25
2	A	3	4	5	5	5	22
3	V	5	5	5	5	5	25
5	V	5	5	5	5	5	25
8	A	4	5	4	5	5	23
16	A	5	4	5	5	5	24
17	A	5	5	5	5	5	25
18	A	5	5	5	5	5	25
19	V	4	5	4	5	5	23
26	A	5	1	0	0	1	7
27	A	5	5	5	5	5	25
29	A	5	5	5	4	5	24
33	A	5	5	5	4	5	24
39	V	5	4	5	5	5	24
	Total	66	63	63	63	66	321
	Mean	4.71	4.50	4.50	4.50	4.71	22.93
	Ratio	.94	.90	.90	.90	.94	.92

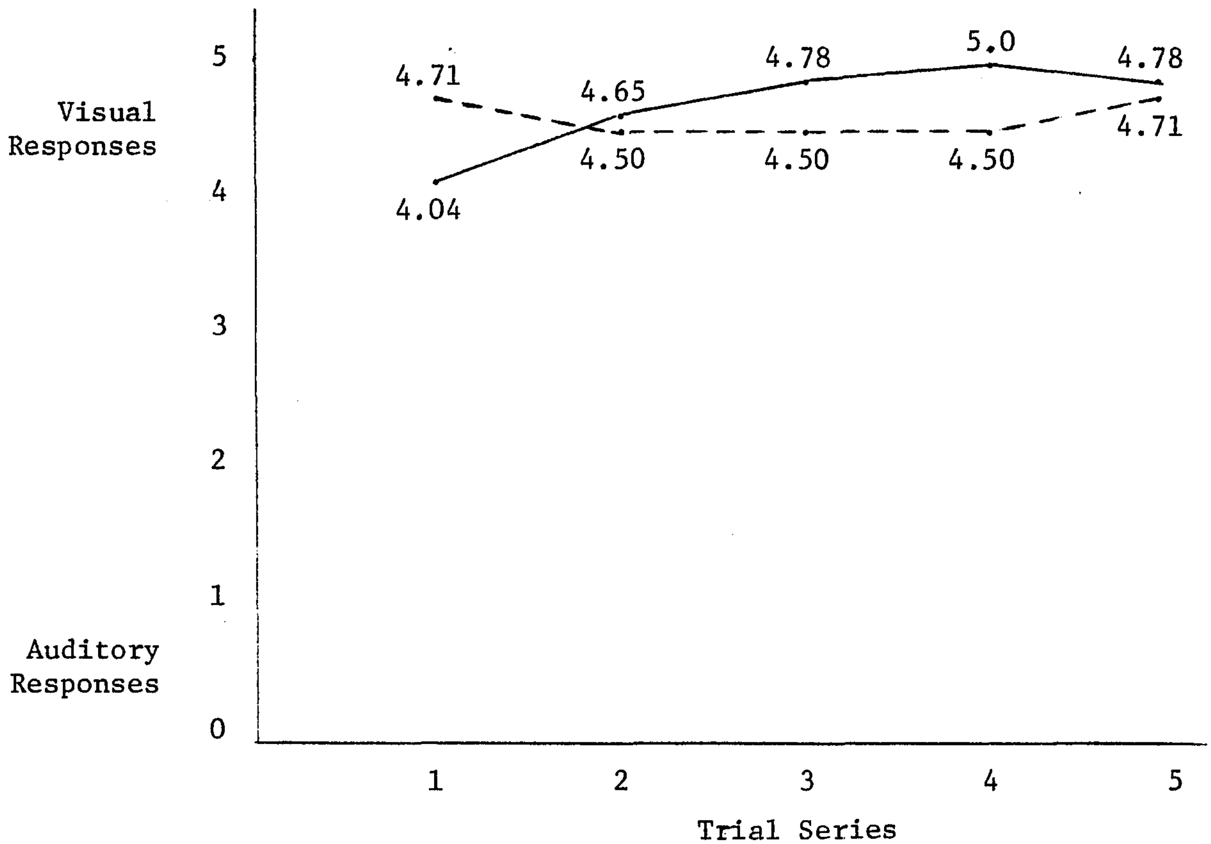

Fig. 1 Dominance x Treatment Interaction. Mean number of visual responses.

Visual subjects — — — —

Auditory subjects ————

"auditory" subjects steadily increased their visual responses on Tasks 2 and 3, and reached a maximum mean of 5.0 on the most difficult Task 4. "Visual" subjects, by comparison, declined slightly in their visual responses on the second task ($\bar{X}$=4.50) and maintained that response level through Tasks 3 and 4. On Task 5, means of the visual response group were virtually equivalent ("auditory" $\bar{X}$=4.78; "visual" $\bar{X}$=4.71).

The response pattern of the "auditory" group did differ significantly from that of the "visual" group across tasks, but not in the manner predicted. "Auditory" subjects increased their visual responses while "visual" subjects maintained a consistently high level of visual responses. Both groups responded predominantly to the visual stimuli.

Self-Report Analysis

In order to learn how subjects may have consciously determined their attentional response choices to the discrepant stimuli presentations, they were asked for a self-report at the conclusion of their interviews:

"There were twenty-five trials when the visual presentation was different from the auditory presentation. Did you notice any of those?" Each of the forty-one subjects responded affirmatively indicating by other interview comments that discrepancies were obvious to them during the first series of trials.

Subjects were then questioned further:

"What did you think to yourself when you noticed them? What did you do when you noticed them?"

Seventeen subjects attributed to the video-taped presenter the intention to confuse or trick the subjects.

Twenty-seven subjects expressed a concerted effort to attend to the visual stimuli and ignore the auditory stimuli.

Nine subjects clearly articulated some form of the maxim, "Seeing is believing."

Apparently, by their own reports, all of the subjects were aware of stimulus conflicts. Most consciously chose to value or trust their visual perceptions rather than their auditory perceptions when attending to the discrepant auditory and visual stimuli.

Post Hoc Comparison Group

During the process of gathering data, a visual dominance effect seemed imminent. In order to discover whether the writing of responses might implicitly bias the attention of subjects toward the visual stimuli, ten additional subjects were randomly selected from the same population. Eight males and two females similar in age to the experimental subjects were individually subjected to the same audio-visual presentations, except that they were instructed to vocalize their responses to the stimuli presentations rather than to write them.

The visual-response mean for the experimental group (written responses) was 23.1 with a standard deviation of 3.53. The visual response mean for the control group (vocalized responses) was 22.5 with a standard deviation of 3.60.

A t-test was used to analyze the visual response means of the two groups. There was no significant difference between the original group and the comparison group, $t(1)=1.02$, $p > .05$.

The possibility of visual bias due to the written mode of responses was not supported.

DISCUSSION

The primary question of this study was, "How valid is Bandler and Grinder's (1975) construct of differing 'most highly valued representational systems' among individual humans?" In order to answer this primary question several secondary questions were investigated.

Question One

The first question was directed toward the method which Bandler and Grinder themselves devised to observe and measure their construct of "most highly valued representational systems." Does their predicate method effectively classify individuals as auditory or visual in terms of their hypothesized, primary representational system?

Forty-one subjects were interviewed and asked to describe their experiences and reactions to an audio-visual experimental procedure. These interveiws were tape recorded, and two judges classified the verbs, adverbs, and adjectives expressed by each subject according to Bandler and Grinder's instructions.

Initially it was arbitrarily determined that 51% of the subjects' sensory predicates had to be auditory, kinesthetic, or visual before that subject could be classified according to that particular category. Only ten subjects (24%) were classified by the predicate method using this criterion.

The criterion was then adjusted to 45% meaning that the highest proportion of subjects' predicates had to exceed the 45% level and still exceed the second most frequent predicate category by 18%. Eighteen of the forty-one subjects (44%) were classified by the predicate method according to the adjusted criterion.

Since no more than 44% of the subjects screened as likely auditory or visual candidates could be classified by the less stringent criterion, it was concluded that Bandler and Grinder's predicate method does not efficiently classify the majority of individuals.

Question Two

The second question asked whether individuals classified by an alternate form of the predicate method would be similarly classified by the original predicate method. As an "input" method, a screening inventory presented auditory, kinesthetic, and visual predicates for which subjects indicated their preferences. Those individuals who evidenced clear preferences for auditory of visual predicates were classified as auditory or visual. It was expected that subjects screened as auditory by their predicate preferences would also be classified as auditory by the predicate "output" method. Likewise, subjects screened as visual were expected to be correspondingly classified by the predicate method. In other words, a significant positive correlation was predicted between the "input" and "output" mehtods for classifying individuals' "most highly valued representational systems."

All forty-two subjects were used in this analysis by employing a simpler measure of predicate productions. The ratio of the auditory predicates to the sum of both the auditory and visual predicates yielded a proportion of auditory predicates expressed by each subject. The correlation between this proportion and the auditory or visual screening classifications was very low.

Contrary to expectations, there were no differences between auditory and visual groups in actual predicate productions and no evidence of predictability between the screening classifications and predicate method classifications. No evidence of construct validity was found since both methods were derived from the same construct.

It sould be noted that the screening instrument was initially developed for the purpose of determining whether or not candidates for Bandler and Grinder's auditory classification might be secured. It was constructed, then, as an exploratory test for which reliability coefficients were unavailable.

It should also be noted that the screening instrument was not intended as a criterion against which the predicate method was to be evaluated. Rather, the predicate method was assumed as Bandler and Grinder's original criterion. The screening instrument was developed as an alternate method by which additional support for the validity of the predicate method might be obtained.

Predictably, the fallibility of the predicate method diminishes the probability of positive covariance with any alternate method. Since in this instance, both measures were drawn from the same theoretical network and administered as recommended, their common failures and low correlation raise serious questions about the validity of the Bandler-and-Grinder construct.

Question Three

The third question asked whether individuals classified as auditory or visual by the predicate method would respond differently to simultaneous, but discrepant presentations of auditory and visual stimuli. It was expected that individuals classified as auditory would respond most frequently to the auditory stimuli on discrepant trials. Conversely, it was expected that visually classified individuals would respond most frequently to the visual stimuli on the same trials.

In order to include more than the eighteen subjects classified under the 45% criterion by the predicate method, the criterion was again readjusted according to auditory predicate proportions (see page 56). Those subjects whose auditory predicate proportion was greater than 49% were designated as auditory while those whose auditory predicate proportion was less than 50% were classified as visual.

The analysis of the number of visual responses by both auditory and visual groups indicated that there was no significant difference between the two groups as had been predicted. Rather, the responses by subjects in both groups were overwhelmingly visual. 92% of the 925 possible responses were to the visual stimuli. Only one of the thirty-seven subjects responded primarily to the auditory stimuli. That subject interestingly had been screened as auditory and subsequently classified as visual by this predicate method.

It was concluded that predicate-method classifications do not accurately predict the attentional behaviors of individuals.

On the other hand, the extermely high incidence of visual responses supports the visual dominance principle consistently reported in experimental literature. Specifically, the visual dominance effect of this study parallels that reported by Colavita (1974, 1979). Measuring subjects' reaction times to the presentation of a light and tone, Colavita tested five conflict trials when the light and tone were simultaneously presented. He noted in his first experiment that 49 of the 50 responses on conflict trials were to the light. This high visual response rate was consistent even in experiments when subjects were alerted to the conflict trials and instructed to attend to the tone.

The present study provides evidence that the visual dominance effect generalizes to an experimental design in which linguistic symbols rather than tones and lights are used and to problems of recognition rather than measuring the reaction times of subjects' responses. Also, unlike the subjects in Colavita's experiments who reported no awareness of the tone during conflict trials, all subjects in this experiment reported their knowledge of the discrepant presentations and their conscious decision to attend and respond to the visual stimuli.

One possible explanation of this pervasive visual dominance effect is that the experimental design was visually biased. Several potential sources of such a bias may be proposed - the use of a visually prepotent stimulus transmitter, the use of visually-loaded words in the instructions, and the visually-dependent mode of response required.

A television set rather than a tachistoscope and earphones or a specially-constructed stimulus transmitter was chosen to make experimental presentations because of its natural role in the daily lives of the student subjects. One of the subjects interviewed compared the presentations to those she had experienced on "Sesame Street," a popular children's television program. In Colavita's experiments, however, even when the stimulus intensities were controlled so that the auditory signal was twice the intensity of the visual signal by subjects' own estimates, the visual dominance effect still resulted. If, by Bandler and Grinder's theory, a dominant representational system biases an individual's attention toward stimuli associated with that sensory system, then a visual bias in the stimulus transmitter should be of little consequence for auditory individuals. Only one of the forty-one subjects consistently attended to the auditory stimuli. It is assumed that if there is a visual bias due to the medium of stimulus presentations, that bias did not significantly affect the attentional response of subjects.

Care was taken to provided neutral instructions which were simultaneously explicit enough so that subjects would be able to respond to all presentations rather than giving up or making up responses. After deliberation, "notice" was selected as the most neutral and explicit of the imperatives considered. "Letter" and "number" were similarly chosen.

The fact that three sujbects did not complete the first series of responses and three other subjects gave more auditory than visual responses on the same series suggests that "notice" did not connote "look" for all subjects. In the post-treatment interviews, seventeen of the subjects expressed confusion about whether they were to record what they saw or what they heard. And when several subjects were asked directly how they understood the word "notice," as many said that it specified neither seeing nor hearing as those who took it to mean "look."

Again, in Colavita's (1974) fourth experiment, the visual dominance effect resluted even when subjects were instructed to attend to the auditory stimulus on simultaneous presentations of the light and tone. It is nevertheless possible that the experimental instructions were visually-weighted to some degree. It is also possible that the English language may be visually dominant with reference to its verb, adjective and adverb vocabulary.

It is noteworthy that during the fourth and most difficult of the stimuli presentations, the first five presentations were single-channel presentations - three were auditory and two were visual. While the intent of the single-channel presentations was to realert subjects to the double-choice possibilities for their attentional responses, the result was that the twenty-three subjects classified as auditory made 115 visual responses out of the 115 possible responses. The combined visual response frequencies of both groups also was greater on this series of presentations than on any other series. The visual bias may be less a function of verbal instructions or presentations and more a function of the attending subjects.

The possibility of a visual bias due to the requirement that responses be written on paper, a task requiring vision rather than vocalization, was tested. In a pilot study, subjects were instructed to vocalize their responses to the stimulus presentations rather than writing them. Their responses did not differ significantly from those of subjects who wrote their responses. The recurrence of the visual dominance effect provides evidence that the difference between the response formats does not account for that effect.

Question Four

Lacking even the theoretical assertions of Bandler and Grinder this was the most exploratory of the questions asking whether increasing stimulus and task complexity would yield increasing auditory responses for subjects classified as auditory and increasing visual responses for subjects classified as visual. A diverging pattern of responses was expected across trials. Auditory subjects, however, began making visual responses and increased their frequency of visual responses through the most difficult fourth series of tasks, diminishing their visual responses only slightly on the fifth series of presentations. Those classified as visual, on the other hand, began with a high frequency of visual responses on the first series of presentations, declining slightly during the second through fourth series, and increasing their visual responses again on the fifth set of trials.

The diverging patterns of frequencies expected between the groups were not found even though the interaction effect was significant.

These negative results may be accounted for once more by the failure of the "predicate method" to detect validly the dominant auditory and visual representational systems posited by Bandler and Grinder.

It is concluded that subjects in this study attended to visual stimuli more than to auditory stimuli throughout the simultaneous and discrepant stimuli presentations without significant shifts in their response frequencies.

Implications

Instead of evidence for differing "most highly valued representaional systems" among individuals the empirical evidence, including the results of this study, suggest a human visual dominance. Several attempts to account for the visual dominance effect appear in the literature (Egeth and Sager, 1977; Klein, 1977; Posner, Nissen and Klein, 1976). From the interview reports of the subjects in this study, the propositions of Posner _et al_. (1976) seem most fitting. According to their findings, visual stimuli are less alerting than other sensory stimuli and require the efforts of active attention on the part of subjects. Twenty-seven of the subjects in this study expressed their concerted effort to attend to the visual stimuli and ignore the auditory stimuli.

Posner _et al_. conclude:

> To compensate for the low alerting capability of visual signals, subjects exhibit a general attentional bias toward the visual modality whenever they are likely to receive reliable input from that modality. This bias may not be obvious to them, but it can be viewed as a strategy of a very pervasive sort. (p. 161)

In this study subjects were very much aware of their visual bias and frequently justified it in their interview reports:

> "You have to choose what impressed you first. I felt safer, more correct to put down what you see. You can't distort that. You can distort a voice, but you can't distort what you see. (Subject #15)

> "What was I supposed to be doing? I decided to put down what I saw. I rely on my eyes more. 'Seeing is believing.'" (Subject #19)

Perhaps the issues are trust and the desire to be correct. Regardless of how it may eventually be explained, the visual dominance effect was again supported as the most important finding of this study.

In summary, this study found no evidence to support the construct of individually differing "most highly valued representational systems" as proposed by Bandler and Grinder. Their own predicate method failed to classify a majority of individuals as clearly auditory, visual, or kinesthetic. Predicate-method designations of auditories and visuals were not related to classifications by an alternate method or to subjects' attentional responses. There is therefore no evidence of construct validity.

Support was found for visual dominance among humans rather than primary perceptual differences for individuals. The visual dominance effect reported by Colavita *et al*. generalizes from reaction-time experiments employing light and tone stimuli to a choice-response paradigm presenting linguistic stimuli by opposing sensory modes.

This additional evidence for visual dominance in human perceptions casts doubt on the constructs of Bandler and Grinder, but reasserts future research relating conscious attentional mechanisms to the ways visual perceptions gain control of these mechanisms.

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APPENDIX A

FIRST IMPRESSIONS INVENTORY

This is a screening instrument for an experiment on "First Impressions." Please trust your first impressions as you mark each of your nine choices below.

Mark the phrase that seems most vivid or engaging to you.

1.___the crackling of the burning logs
___sprays orange sparks into the dark night
___as people huddle to warm themselves
2.___deep blue waves with white caps
___roar steadily splashing on the beach
___and sink softly into the sand
3.___a tremor shakes the concrete platform beneath our feet
___train tracks begin to clatter as a shrill whistle blasts
___the big, black steam-engine rounds the bend

Mark the words that seem most immediate or striking to you.

4.___the icy spring
___the gurgling spring
___the crystal clear spring
5.___a wink
___a pat
___a whisper
6.___a screech
___a jab
___a flash

7. Mark the sentence you would prefer in place of "I understand you."

___"I see what you are saying."
___"What you are saying feels right to me."
___"I hear what you are saying."

8. Mark the sentence you would prefer in place of "That's okay with me."

___"That feels good to me."
___"That sounds good to me."
___"That looks good to me."

9. I remember best when I can

___recall the words or sounds in my head
___get the feel of what was going on
___re-picture things in my head

Thank you for your attention and cooperation.

If invited, I would consider participating in a half-hour experiment on "First Impressions." (You will be free to withdraw from the experiment at any time.)

NAME ______________________________

ADDRESS ______________________________

PHONE ______________________________

APPENDIX B

FIRST IMPRESSIONS EXPERIMENT

PLEASE WORK RAPIDLY. DO THE BEST YOU CAN. FILL IN EACH BLANK. THANK YOU.

I.	II.	III.	IV.	V.
1.__	1.__ __ __	1.__ __ __ __	1.__ __ __	1.__________
2.__	2.__ __ __	2.__ __ __ __	2.__ __ __	2.__________
3.__	3.__ __ __	3.__ __ __ __	3.__ __ __	3.__________
4.__	4.__ __ __	4.__ __ __ __	4.__ __ __	4.__________
5.__	5.__ __ __	5.__ __ __ __	5.__ __ __	5.__________
6.__	6.__ __ __	6.__ __ __ __	6.__ __ __	6.__________
7.__	7.__ __ __	7.__ __ __ __	7.__ __ __	7.__________
8.__	8.__ __ __	8.__ __ __ __	8.__ __ __	8.__________
9.__	9.__ __ __	9.__ __ __ __	9.__ __ __	9.__________
10.__	10.__ __ __	10.__ __ __ __	10.__ __ __	10.__________
11.__	11.__ __ __	11.__ __ __ __	11.__ __ __	11.__________
12.__	12.__ __ __	12.__ __ __ __	12.__ __ __	12.__________
13.__	13.__ __ __	13.__ __ __ __	13.__ __ __	13.__________
14.__	14.__ __ __	14.__ __ __ __	14.__ __ __	14.__________
15.__	15.__ __ __	15.__ __ __ __	15.__ __ __	15.__________

Experimental Number__________

Age__________ Sex__________

Student Classification__________

Major__________

VITA

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EXAMINATION AND THESIS REPORT

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Title of Thesis: A Validity Study of the Construct "Most Highly Valued Representational System" in Human Auditory and Visual Perceptions

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